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Ithaca, N.Y. 14853-2801GRANT  
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20 January 1993

To: Gene Bartell  
From: Mike Davis  
Subject: Final Report - SETI Grant NAG 2-696



Funds from the SETI Investigators Working Group grant NAG 2-696 were fully expended to cover my travel to IWG meetings and to provide 5% of my salary, which almost exactly corresponded to the time expended on the meetings.

During this period the SETI project prepared for the initial observations with both the Targeted Search and Sky Survey systems. I am nominally a member of the Targeted Search team, but participated actively in both parts of the project. My activities were concentrated primarily in three areas: Coordination with Arecibo Observatory in preparation for the initial observations on October 12, 1992; development of a design concept for confirming observations; and participation (at JPL) in a design review of the rf system.

#### Coordination Activities

The inaugural SETI observations scheduled for the 500th anniversary of Columbus arrival in the new world required extensive advance preparation. My activities ranged from participation in a discussion with officials of the Puerto Rican Commonwealth at meetings in San Juan to assistance in getting a 56 kilobaud data link extended to the Observatory. As Observatory Director I was able to delegate much of the detailed preparation to the staff, who participated enthusiastically in the event.

#### Confirming Observations

It has always seemed unreasonable to me that a ten million channel spectrometer should waste 99.999% of its channels and a great deal of observing time to confirm candidate narrow band signals. Once a candidate signal frequency is identified, a 100 channel system can do the job at least as well. Partly as a result of my suggestions, a design is being developed by the SETI engineers for a narrow band confirming spectrometer to do this. The concept is particularly applicable in those cases where the confirmation is at a separate telescope. In this case, the narrow band system is the only one needed, and can be used on a continuous basis (if the telescope time is available) to continuously check the strongest candidate(s) detected with the wide band spectrometer on the main telescope. One can show that this leads to a significant improvement in sensitivity.

#### RF System Design Review

At the invitation of the JPL engineering team, I sat in on the design review of the RF system. This was both informational for me and apparently useful to the design team. The particular

requirements of the RF installation at Arecibo came up in discussion, and I was able to provide useful data. In addition, the radio astronomy experience with RFI, and techniques for dealing with it, formed a useful background.